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(54) Wax composition for the manufacture of candles in containers, method for the manufacture of said candles and candle obtained with said composition

(57) A wax composition and a method for the manufacture of candles in containers in which from 18 to 24 parts in weight of a paraffin wax are mixed with one part in weight of a microcrystalline wax with a penetration value of at least 60 ddm.

The invention makes it possible to increase the productivity of the plant, though providing a product that is completely free from surface defects, is cosmetically superior to that obtained with the conventional waxes and in any case still behaves perfectly during burning.

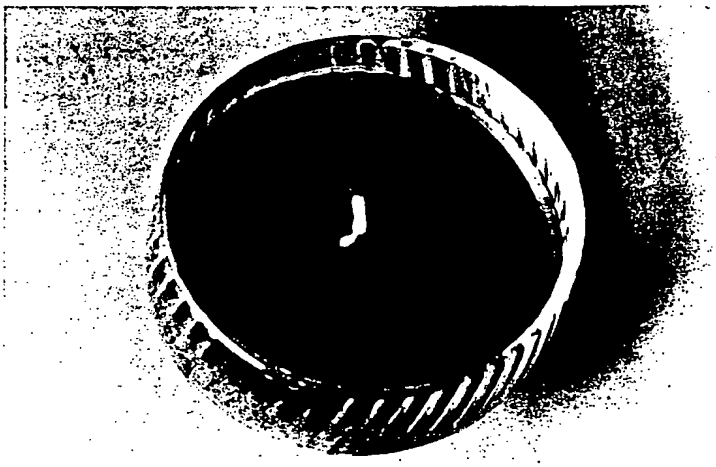

PHOTO 5

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Description

[0001] The present invention concerns a wax composition for the manufacture of candles in containers. Said invention extends to the method for manufacturing these candles, as well as the candle thus obtained.

[0002] The field of the invention is that of the waxes used in the mechanized manufacture of candles provided with a container. In particular, this manufacture provides for an initial container (made of glass and the like, preferably transparent) to be filled with wax poured in the molten state around a wick, also accommodated inside said container. The production cycle is then completed by cooling of the wax, so that it hardens, and packaging of the end product.

[0003] The above described procedure has the drawback of often being made excessively long because of the time necessary for the wax to reach the desired degree of setting and solidification inside the container. Moreover, this solidification time cannot be reduced indiscriminately (for example through very drastic cooling of the wax) without causing irregularities to occur on the surface of the candle.

[0004] In fact cooling is known to cause retraction of the wax inside the container into which it has been introduced in the molten state. Should this retraction occur too rapidly, numerous different cosmetically undesirable irregularities would appear on the visible surface of the candle. To be more precise, incorrectly performed cooling of the molten wax in order to accelerate setting would result in the formation of bubbles, holes, cracks, gaps and other irregularities, visible on the portion of wax surrounding the wick and also on that adhering to the glass walls of the container. Furthermore, excessively fast cooling can cause migration of any coloring agents towards the outer surface of the candle, thus altering the cosmetic appearance of said candle.

[0005] For this reason the wax compositions currently used for the mechanized manufacture of candles in containers do not permit the present hourly production limits to be raised. Thus, for example, even at just 3,000 pieces/h the majority of the candles manufactured has numerous irregularities (at least 3% of the pieces with serious damage).

[0006] As a result, a feature of the manufacture of candles in containers at present is the low productivity of the plant, due to the time that is normally necessary to allow the wax to set, without such irregularities appearing on the surface of the product as to make it unacceptable for the market.

[0007] The principal object of the present invention is therefore to provide a wax composition for the manufacture of candles in containers, able to reduce or even eliminate the deformations present on the surface of the end product, whilst maintaining the same hourly production rate of the system.

[0008] A further object of the invention is to provide a wax composition of the aforementioned type that makes it possible to increase the production rate of the plant, without the occurrence of the above mentioned irregularities on the surface of the candle.

[0009] It is a further object of the present invention to provide a wax for candles in containers that makes it possible to cut down the cooling times currently made necessary by the known compositions, though without the occurrence of surface defects and without compromising the behaviour of the candle when it burns.

[0010] Yet another object of the invention is to provide a wax composition for candles that makes it possible at the same time to achieve a high production rate and mechanized packaging of the end product, directly at the end of the production line.

[0011] These and other objects are achieved with the wax composition according to the present invention for manufacturing candles in containers of the type made up of a mixture of paraffin wax and at least one microcrystalline wax, this composition being characterized essentially in that it consists of a microcrystalline wax having a penetration value of at least 60 ddm.

[0012] This microcrystalline wax preferably has a penetration value of 70 ddm and is present in the composition in a ratio of one part in weight to 18-24 parts in weight of said paraffin wax. Said microcrystalline wax is advantageously a "MULTIWAX W 835" ® wax.

[0013] In accordance with other characteristics of the invention, said wax composition comprises, in a mixture:

INGREDIENT	% WEIGHT
Microcrystalline wax	3.5-5
Penetration 60 ddm	
Perfumed essences	5-8
Colouring agents	0.1-0.5
Colour stabilizing agent	0.2 - 0.4

(continued)

INGREDIENT	% WEIGHT
Paraffin wax	q.s. to 100
Melting point: 50-54°C	

and, preferably:

INGREDIENT	% WEIGHT
Paraffin wax	88.3
Melting point 50-54°C	
MULTIWAX W 835 (Penetration 70 ddm)	4.5
Perfumed essences	6.7
Colouring agents	0.25
Colour stabilizing agent	0.25

[0014] The method for the manufacture of candles in containers, which also forms the subject matter of the present invention, obtained with the above composition is characterized essentially in that it provides for an hourly production that is higher than 4,500 candles in containers and is advantageously 5,400 pieces/hour.

[0015] In accordance with other characteristics thereof, this procedure provides for a wax cooling time of 15 min at the temperature of 10°C and mechanized packaging of the product at the end of the production line.

[0016] Compared with the prior art of wax compositions for candles in containers, that of the present invention allows the productivity of the system to be increased, yet provides a product completely free from surface defects, cosmetically superior to that obtained with conventional waxes and which in any case still behaves perfectly during combustion.

[0017] As far as the candle manufacturing process is concerned, the wax composition of the invention allows cooling times to be reduced and mechanized packaging of the end product directly at the end of the production line, that is, without the traditional pause of said product in a different environment for setting and solidification of the wax.

[0018] The wax composition according to the present invention consists of a mixture of a paraffin wax with at least one particular microcrystalline wax. The term microcrystalline waxes defines some mixtures of hydrocarbons of high molecular weight, mostly belonging to the aliphatic series (C_nH_{2n+2}) and, to a lesser extent, of the olefinic series (C_nH_{2n}).

[0019] The use of microcrystalline waxes in general in the manufacture of candles in containers has already been known for a long time. However, the compositions in which these microcrystalline waxes are used do not permit the advantageous results obtained with the present invention. The conventional compositions of the type being examined, in fact, give an end product that is still excessively damaged, and therefore not suitable to be put on the market, even at production rates as low as 3,000 pieces/h (that is, still at relatively low hourly production rates).

[0020] According to the present invention, it has now surprisingly been found that by choosing, among the microcrystalline waxes commercially available at present, those characterized by a sufficiently high penetration number, generally at least 60 ddm (that is, 60 tenths of a millimetre, as measured at 25°C according to ASTM standard D 1321), it becomes possible to reach hourly production rates greater than 4,500 pieces, yet without the above mentioned irregularities arising on the surface of the candle material, solidified inside its glass container. For the purposes of the invention, this microcrystalline wax preferably has a penetration value of 70 ddm and it advantageously consists of a "MULTIWAX W 835" wax, a registered trademark of WITCO Inc. (USA).

[0021] As already stated, the microcrystalline wax having the above mentioned properties is added in a mixture to a paraffin wax, preferably with a melting point of 50-54°C (for example, an AGIP 122 paraffin wax from AGIP PETROLI SpA), possibly also in the presence of perfumed essences, colouring agents and colour stabilizing agents (for example, "UVINOL 3008" stabilizer, a registered trademark of BASF Co., USA).

[0022] This composition is normally made up of 18-24 parts in weight of paraffin wax to one part in weight of microcrystalline wax. In particular, the complete composition presents the following quantitative values for the ingredients in the mixture:

INGREDIENT	% WEIGHT
Microcrystalline wax	3.5-5
Penetration 60 ddm	
Perfumed essences	5-8
Colouring agents	0.1 - 0.5
Colour stabilizing agent	0.2 - 0.4
Paraffin wax	q.s. to 100
Melting point 50-54°C	

[0023] According to a preferred embodiment of the invention, the wax composition is made up of:

INGREDIENT	% WEIGHT
Paraffin wax	88.3
Melting point 50-54°C	
MULTIWAX W 835 (Penetration 70 ddm)	4.5
Perfumed essences	6.7
Colouring agents	0.25
Colour stabilizing agent	0.25

[0024] In order to demonstrate the results offered by the invention with respect to the prior art of waxes used in the manufacture of candles in containers, the following examples are provided.

EXAMPLE 1 - Prior art

[0025] The following wax composition was prepared for the manufacture of candles in containers, in which a conventional microcrystalline wax with a low coefficient of penetration was employed:

INGREDIENT	TYPE	% WEIGHT
Paraffin wax	AGIP 122	88.3
Microcrystalline wax	S&R (13 ddm)	4.5
Essence	Berry	6.7
Colour	Blue	0.25
Stabilizing agent	UVINUL 3008	0.25

[0026] This composition was then used in the production of 3,055 pieces/h of candles in glass containers, with cooling lasting for 25 min at the temperature of 10°C. The description of the end product is provided in the table below.

EXAMPLE 2 - Invention

[0027] The following wax composition was prepared for the manufacture of candles in containers, in which a MULTI-

WAX W 835 microcrystalline wax with a penetration value of 70 ddm was used:

INGREDIENT	TYPE	% WEIGHT
Paraffin wax	AGIP 122	88.3
Microcrystalline wax	MULTIWAX W 835	4.5
Essence	Berry	6.7
Colour	Blue	0.25
Stabilizing agent	UVINUL 3008	0.25

[0028] This composition was then used in the production of 5.389 pieces/h of candles in glass containers with cooling lasting 15 min at the temperature of 10°C. The description of the appearance of the end product (that is, of the candle with the wax completely set inside the glass container) is provided in the table below.

COMPOSITION	COOLING	No. pieces/h	FINISHED APPEARANCE
EXAMPLE 1	10°C 25 min	3,055	(1)
EXAMPLE 2	10°C 15 min	5,389	(2)

(1) Bubbles: Bubbles on the surface, numerous bubbles on the wax in contact with the glass.
Cracks: Presence of cracks
Colour: White spots on the surface
Seriously damaged pieces: 3%
(2) Bubbles: Absent
Cracks: Absent
Colour: Homogeneous
Seriously damaged pieces: 0%

[0029] One of the defective products in example 1 is illustrated in photographs 1 to 4, in which:

- Photograph 1 shows a top view of a sample of example 1;
- Photograph 2 shows an enlarged detail of the sample in photograph 1;
- Photograph 3 shows a side view of a sample of example 1, as seen through the glass container; and
- Photograph 4 shows an enlarged detail of the sample in photograph 3.

[0030] As can be seen from these images, even at a rather low production rate (about 3,000 pieces/h) numerous obvious surface irregularities are present on the sample, making it completely unacceptable for the market.

[0031] One of the candles in a container obtained, according to the invention, as described with reference to example 2 above, is shown in a top and side view in photographs 5 and 6, respectively. As can be observed from these illustrations, the composition of example 2, characterized by the presence of a microcrystalline wax with a high penetration number and with the other ingredients of the mixture remaining the same, allows a production rate of 5, 389 pieces/h and higher to be achieved, practically in the complete absence of the imperfections which were seen, on the other hand, in the similar product of example 1.

[0032] From the same table it can also be seen that the cooling time is considerably reduced, at the same temperature, with the use of the formulation in example 2, making it possible to provide for mechanized packaging of the end product, directly at the end of the production line and therefore without any need for the candle first to pause for the wax to set.

[0033] Obviously modifications can be made to the description, as described above, to obtain variants which, in any case, come within the sphere of protection defined by the appended claims. Thus, for example, mixtures of different paraffin waxes, or even mixtures of a plurality of microcrystalline paraffin waxes, can be used in the composition of the invention, though observing the penetration values and ratios indicated in said claims.

Claims

1. A wax composition for the manufacture of candles in containers, of the type made up of a mixture of paraffin wax and at least one microcrystalline wax, characterized in that the latter consists of a microcrystalline wax having a penetration value of at least 60 ddm.

2. A composition according to claim 1, characterized in that said microcrystalline wax has a penetration value of 70 ddm.

3. A composition according to claims 1 or 2, characterized in that it comprises from 18 to 24 parts in weight of said paraffin wax, for each part in weight of said microcrystalline wax.

4. A composition according to claim 3, characterized in that said microcrystalline wax is a "MULTIWAX W 835"® wax.

5. A composition according to claim 3, characterized in that it comprises, in a mixture:

INGREDIENT	% WEIGHT
Microcrystalline wax Penetration 60 ddm	3.5 - 5
Perfumed essences	5-8
Colouring agents	0.1 - 0.5
Colour stabilizing agent	0.2 - 0.4
Paraffin wax Melting point 50-54°C	q.s. to 100

6. A composition according to claim 4, characterized in that it comprises in a mixture:

INGREDIENT	% WEIGHT
Paraffin wax Melting point 50-54°C	88.3
MULTIWAX W 835 (Penetration 70 ddm)	4.5
Perfumed essences	6.7
Colouring agents	0.25
Colour stabilizing agent	0.25

7. A method for the manufacture of candles in containers with the use of the composition according to one or more of the preceding claims 1 to 6, characterized in that it provides an hourly production rate greater than 4,500 candles in containers.

8. A method according to claim 7, characterized in that said production rate is 5,400 pieces/h.

9. A method according to claim 7 or 8, characterized in that it has a cooling time for the wax of 15 min at the temperature of 10°C.

10. A method according to one of the preceding claims 7 to 9, characterized in that it provides for mechanized packaging of the product at the end of the production line.

11. Use of a microcrystalline "MULTIWAX W 835"® wax in the preparation of candles in containers.

12. A candle in a container, characterized in that it is obtained with the composition and with the method of the preceding claims.

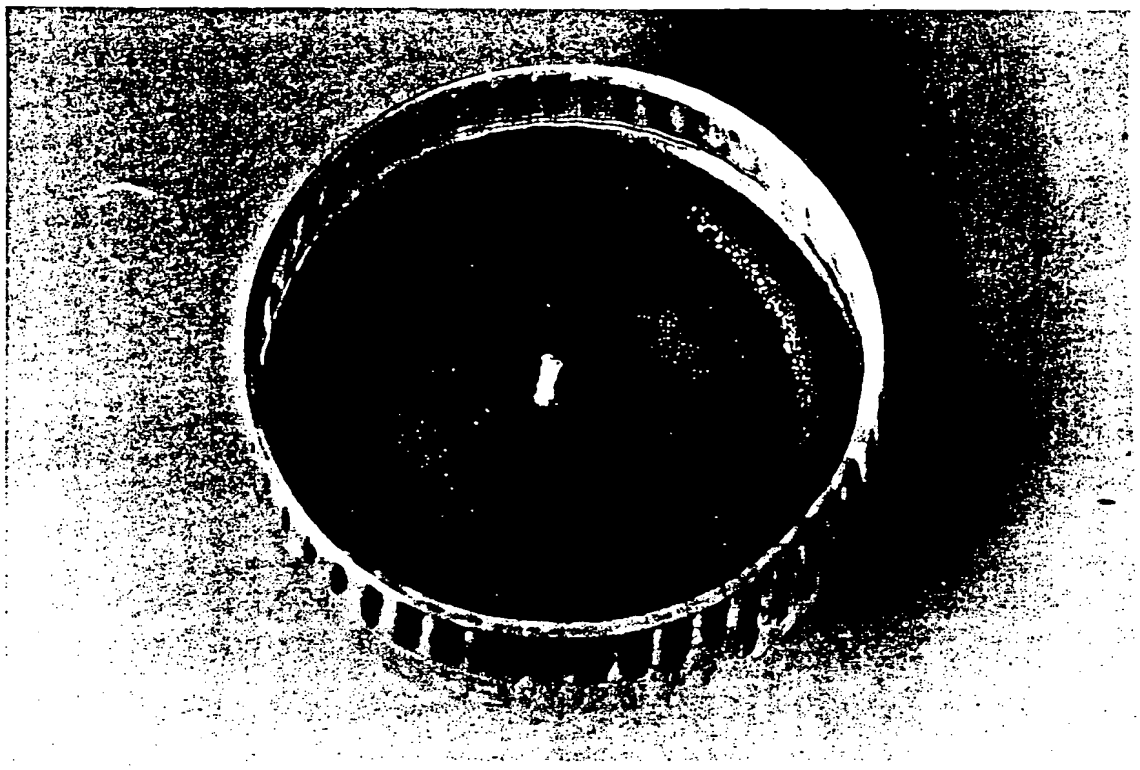


PHOTO 1

PHOTO 3

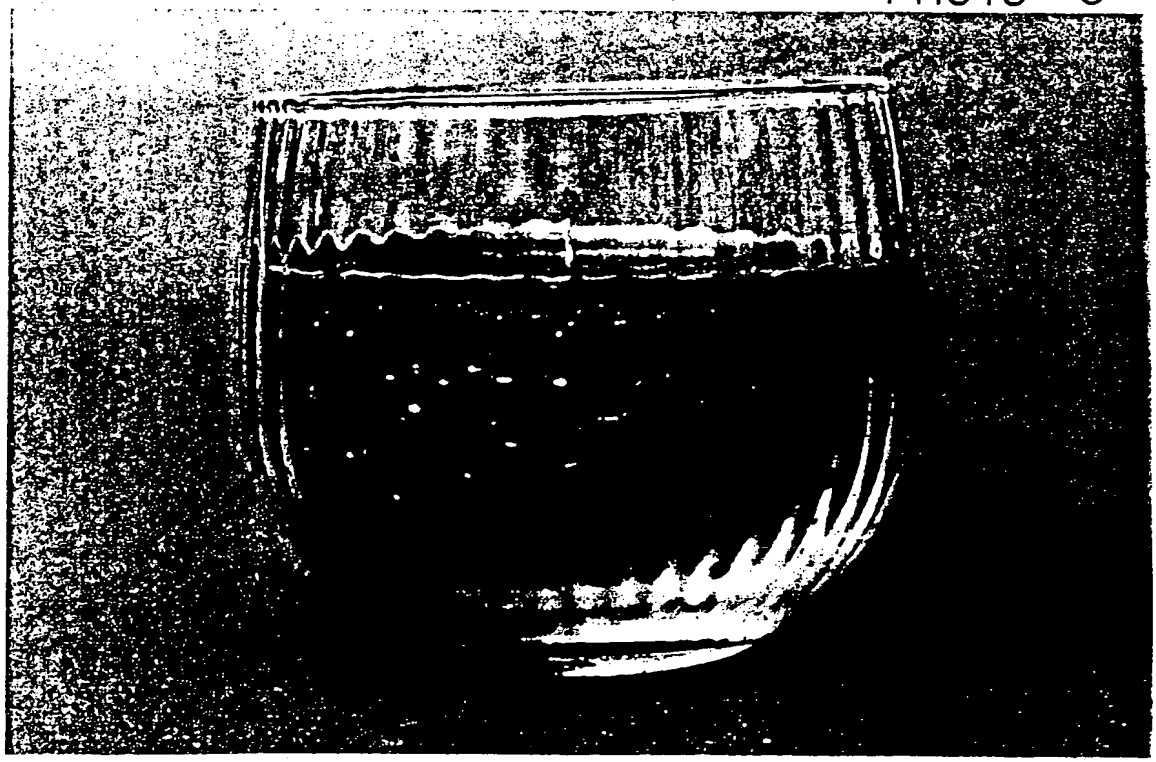


PHOTO 2

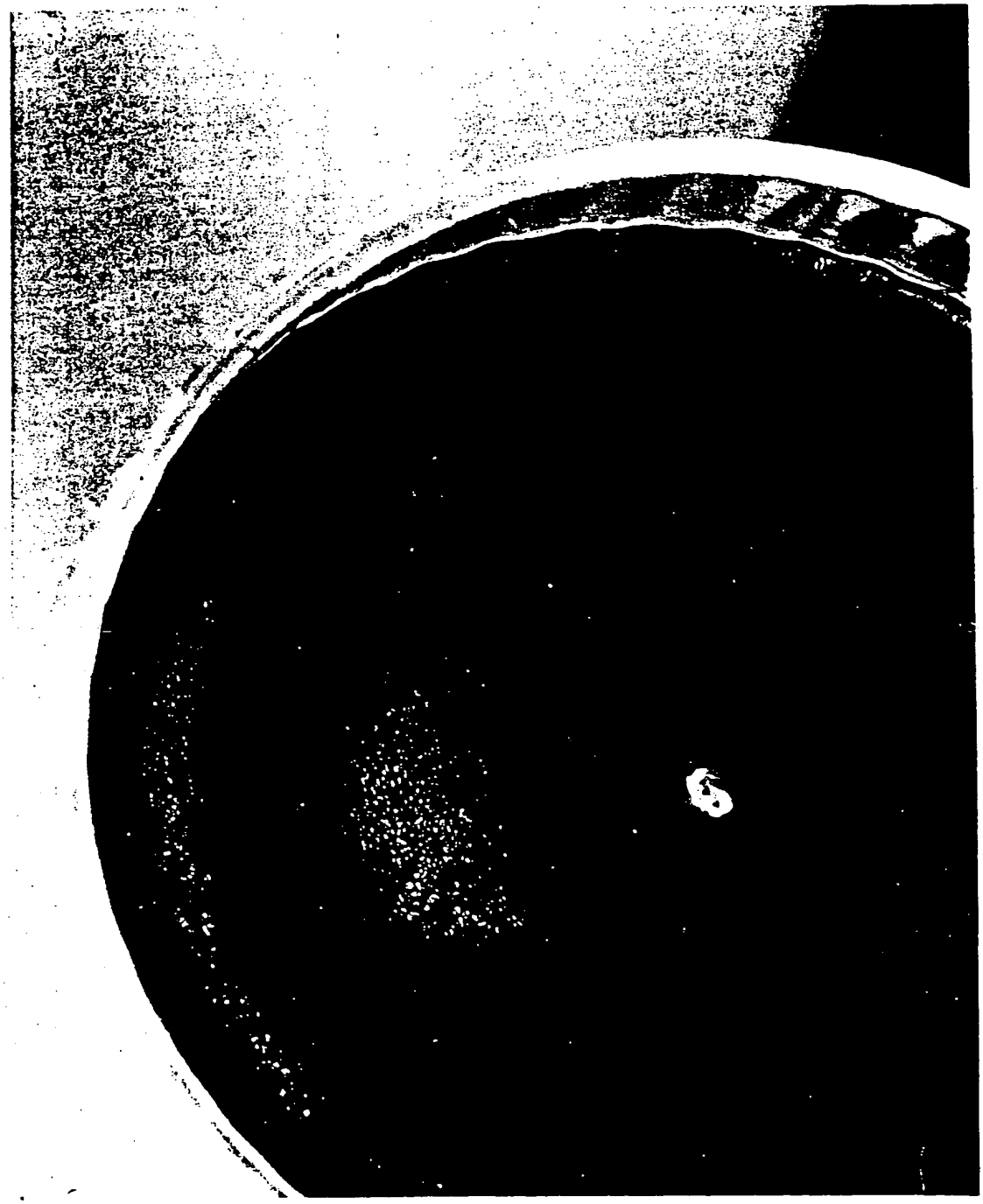


PHOTO 4

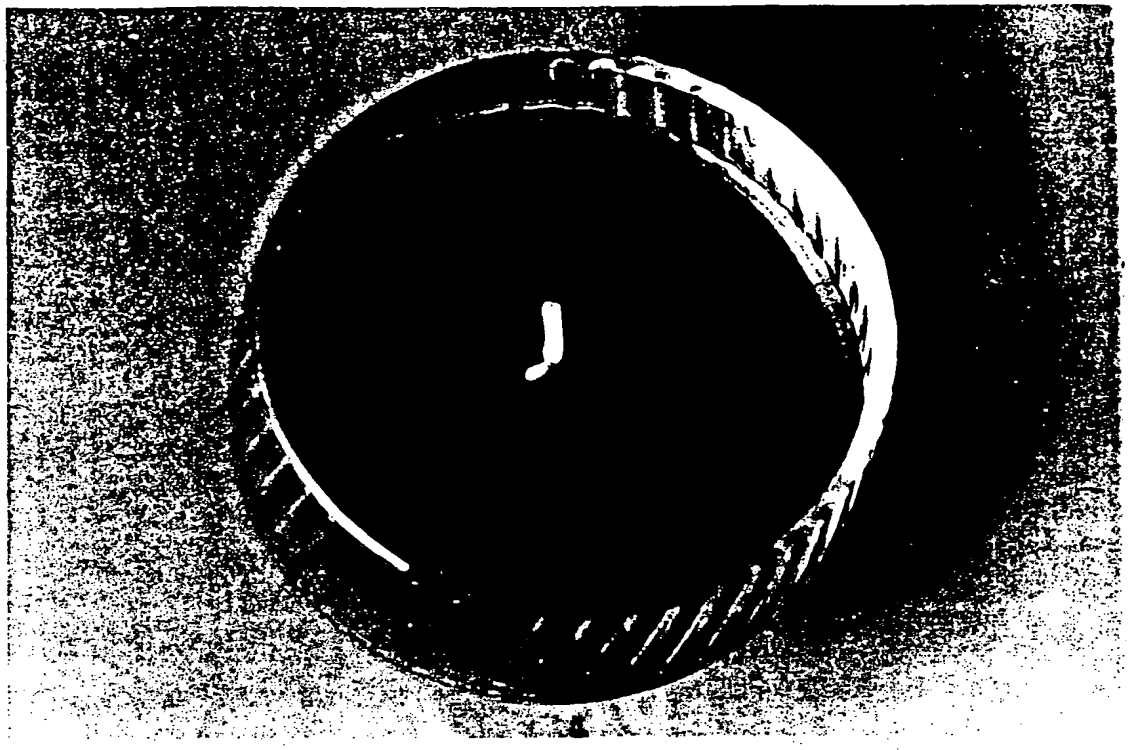
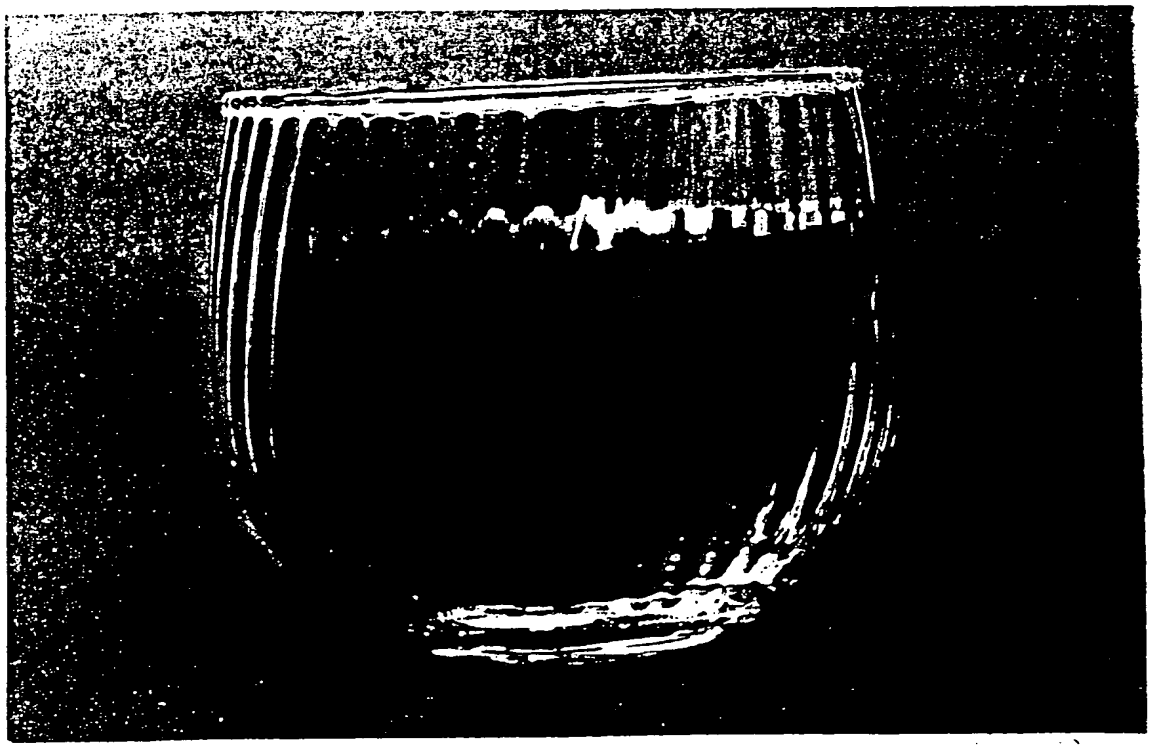


PHOTO 5

PHOTO 6



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EUROPEAN SEARCH REPORT

Application Number
EP 98 83 0008

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	US 2 583 938 A (AUGUST FRENCH) 29 January 1952 * column 3, line 3 - line 58 * * claims 1-3,7,8 *	1-4,11	C11C5/00
Y	EP 0 346 034 A (UNILEVER PLC ;UNILEVER NV (NL)) 13 December 1989 * page 7; table II *	1-4,11	
A	US 3 925 029 A (WILSON WILLIAM W) 9 December 1975 * column 3, line 17 - line 24 * * column 3, line 36 - line 68 * * examples XII-XVI * * claims 1,11,16,17 *	1	
A	DE 196 01 521 A (SCHUEMANN SASOL GMBH & CO KG) 24 July 1997 * claims 1,3-5,9-12 *	1	
A	US 4 507 077 A (SAPPER JOHN M) 26 March 1985 * column 3, line 27 - column 5, line 47 * * column 6, line 21 - line 30 * * claims 1,2,5,7,11,12 *	1	TECHNICAL FIELDS SEARCHED (Int.Cl.6) C11C
A	CA 1 333 218 A (ACTIVA PRODUCTS INC) 29 November 1994 * page 6, line 6 - line 7 * * page 9 - page 10; table * * claims 1,8 *	1	
A	US 3 216 921 A (RICHARD C. FOX) 9 November 1965 * claim 1 *	1	

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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	29 June 1998	Dekeirel, M

CATEGORY OF CITED DOCUMENTS

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EUROPEAN SEARCH REPORT

Application Number
EP 98 83 0008

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 5 037 874 A (NUTTENS HUGO J C ET AL) 6 August 1991 * column 1, line 14 - line 17 * * column 6; table 2 * * column 7; table 3 * * column 8; table 7 *	1	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	29 June 1998	Dekeirel, M

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